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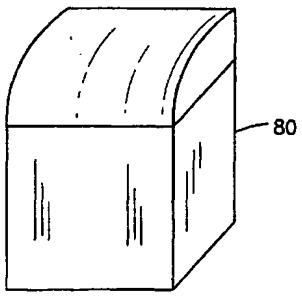
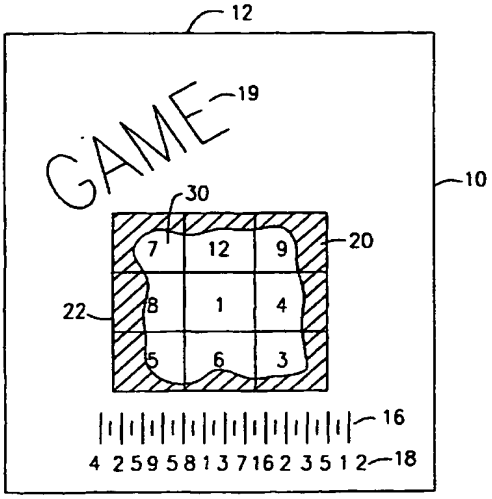
(54) Title: SECURITY PATTERNS FOR INSTANT GAMING TICKETS





(57) Abstract: A secure instant gaming ticket, a system for authenticating the ticket, and methods for producing and authenticating the ticket, include a substrate (12) having a plurality of game indicia and a ticket security signature printed thereon, and an opaque, removable coating (20) disposed on at least a portion of the plurality of game indicia. The coating has a machine readable security pattern (16, 18) related to the ticket security signature disposed thereon. The coating may comprise a plurality of cells (30), each cell (30) being disposed on at least one of the game indicia on the substrate (12) and each cell having an associated cell security signature which forms a part of the ticket security signature.

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SECURITY PATTERNS FOR INSTANT GAMING TICKETS

Background Of The Invention

This invention relates to instant gaming tickets, and in particular, the use of data patterns to enhance the security of instant gaming tickets.

Instant gaming tickets typically include a substrate or card having a play area in which game indicia are printed. The game indicia in the play area are covered with an opaque, removable coating, such as a scratch-off latex coating, to prevent a player from seeing the game indicia printed under the coating prior to scratching off the coating.

An instant probability gaming ticket requires the player to scratch off the latex coating from only a portion of the play area, i.e., to reveal only some of the game indicia which comprise a winning combination of game indicia. For example, a probability game may require the player to scratch off the latex coating covering four out of twenty game indicia to attempt to uncover a winning combination of game indicia. For such a game, a single ticket may have multiple winning combinations of game indicia covered by the latex coating, and any one of the game indicia can be included in one of the winning combinations.

If a player believes that he or she has uncovered a winning combination of game indicia on the instant gaming ticket, the ticket must be validated and authenticated upon redeeming the ticket for a prize. Validation relates to determining whether a winning

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combination of game indicia has been uncovered on the ticket. Authentication involves determining that the instant ticket is not invalid because it had been tampered with or altered.

Authentication is important for instant tickets that are used for probability games because such instant tickets contain all of the combinations of game indicia needed to win the game. With an instant probability game ticket, an unscrupulous player may uncover an unauthorized number of play cells to attempt to determine the winning combination of game indicia, and then transfer all or portions of the latex coating from another instant ticket to leave only a winning combination of game indicia uncovered.

Summary Of The Invention

In general, in one aspect, the invention features a secure instant gaming ticket including a substrate having a plurality of game indicia and a ticket security signature printed thereon. An opaque, removable coating is disposed on at least a portion of the plurality of game indicia, the coating having a machine readable security pattern related to the ticket security signature.

Implementations of the invention may also include one or more of the following features. The ticket security signature may be in the form of a machine readable bar code or machine readable characters. The security pattern may be a variable data pattern, which may be a pattern of dots.

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In general, in another aspect, the invention features a secure instant gaming ticket including a substrate having a plurality of game indicia printed thereon and plurality of cells. Each cell comprises an opaque removable coating disposed on at least one of the plurality of game indicia on the substrate, each cell further having disposed on the coating a machine readable security pattern indicative of a cell security signature associated with the cell. A ticket security signature comprises the cell security signatures associated with each of the plurality of cells.

Implementations of the invention may also include one or more of the following features. The ticket security signature may be printed on the substrate in the form of a machine readable bar code or machine readable characters. The security pattern may be a variable data pattern, which may be a pattern of dots. The ticket security signature may be determined on the basis of a string of characters printed on the substrate.

Each cell may include an ordered series of tiles, each tile having an associated magnitude. The ticket security signature may be an ordered combination of the magnitudes associated with the tiles. The magnitude associated with each tile may be represented by a pattern of dots disposed on the coating.

In general, in another aspect, the invention features an instant gaming ticket authentication system. An instant gaming ticket comprises a substrate having a plurality of game indicia and a security signature printed thereon and an opaque, removable coating disposed on at least a portion of the plurality of game indicia, the coating having

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a machine readable security pattern related to the security signature disposed thereon. A ticket reader determines a ticket security signature based on the security pattern and compares the determined ticket security signature to the printed security signature on the ticket.

In general, in another aspect, the invention features a method of producing a secure instant gaming ticket. Game indicia and a ticket security signature comprising a string of characters are printed on a substrate. At least a portion of the game indicia are covered with an opaque, removable coating. A machine readable security pattern is disposed on the coating, the machine readable security pattern being related to the ticket security signature.

Implementations of the invention may also include the following feature. The method may include determining the machine readable security pattern by parsing the string of characters prior to disposing the machine readable security pattern on the coating.

In general, in another aspect, the invention features a method of authenticating an instant gaming ticket, the ticket having game indicia printed thereon and an opaque, removable coating covering at least a portion of the game indicia, the coating further having a security pattern disposed thereon. The security pattern is detected, and a ticket security signature is determined using the detected security pattern. The determined ticket security signature is compared to a printed ticket security signature on the ticket.

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Implementations of the invention may also include one or more of the following features. The method may include rejecting the ticket if the determined ticket security signature and the printed ticket security signature are not related according to a predetermined criterion, and deeming the ticket authentic if the determined ticket security signature and the printed ticket security signature are related according to a predetermined criterion.

The present invention has the advantage of enhancing the security of instant gaming tickets.

The present invention has the additional advantage that data for authenticating the instant gaming may be stored on the ticket itself, rather than in a remote location, without significantly increasing the amount of data that must be stored on the ticket.

The present invention has the further advantage of using a unique security pattern that is not obvious to the player.

Other features and advantages of the invention will become apparent from the following detailed description, and from the claims.

Brief Description Of The Drawings

Fig. 1 shows an instant gaming ticket and a somewhat diagrammatic ticket reader according to the present invention.

Fig. 2 shows the construction of a play cell of the instant gaming ticket of Fig. 1.

Fig. 3 is a flow chart showing a method of authenticating an instant gaming ticket according to the present invention.

Fig. 4 is a flow chart showing a method of making an instant gaming ticket according to the present invention.

Description Of The Preferred Embodiments

The present invention relates to placing variable data patterns over or on the opaque, removable coating on instant gaming tickets to enhance ticket security. The variable data patterns may be in the form of patterns of dots. A unique signature, which is related to the variable data patterns, is also encoded and printed on each instant gaming ticket. Both the signature and the variable data patterns can be read by a ticket reader to verify that the instant ticket has not been tampered with or altered.

By creating the security patterns over or on the opaque coating on instant gaming tickets, both the validation and authentication functions may be performed by

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a ticket reader. The ticket reader may validate the ticket based on which game indicia have been uncovered to reveal a winning combination. The ticket reader may also authenticate the instant ticket based on the variable data patterns on the opaque coating that still covers game indicia in the play area of the ticket.

The present invention allows the components of an instant gaming system, i.e., an instant gaming ticket, a ticket printer, a ticket reader, and a central system, to increase the level of security by representing large amounts of variable patterns without having to manage large amounts of data or store large amounts of data in a bar code printed on the ticket. Further, the invention may also be used to identify attempts to tamper with the instant gaming ticket. The use of security patterns created on the latex coating also permits validation of the instant ticket using a ticket reader located remotely from a central gaming location, which may communicate data for validating the ticket to the ticket reader. Since a seemingly random pattern of dots is used to encode a security pattern on the instant gaming ticket, the security patterns that are used will not be apparent to the player without a very detailed inspection of the ticket. The security provided by the use of dot patterns may be further enhanced by printing the dot patterns on the coating with an ink that can be read only under a certain type of light, such as light outside the visible spectrum, e.g., infrared light, or monochromatic light in the visible spectrum having a predetermined wavelength.

As shown in Fig. 1, an instant gaming ticket 10 may include a substrate 12 having a play area 22 in which game indicia are printed. The game indicia may be alphanumeric or other symbols arranged in the form of an array. Other information may

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also be printed on ticket 10, such as a machine readable bar code 16, machine readable characters 18, and ornamental graphics 19. The machine readable bar code and machine readable characters may be used for both validation and authentication of the instant gaming ticket and may include, e.g., a game number, a ticket number, a ticket pack number, and a retail sales location number.

Play area 22 of instant gaming ticket 10 may consist of game cells, such as game cell 30. Each game cell is a clearly delineated portion of the play area covered by an opaque, removable coating, e.g., latex coating 20, that may be removed during play. Latex coating 20 may be removed, e.g., by scratching the latex coating with a coin, to play the instant game. The size and number of the play cells is typically a function of the game that is played using the instant ticket. Additional information or graphics, including a ticket security feature, may be printed over or on latex coating 20.

The present invention relates to placing, e.g., by printing, a unique security pattern on the latex coating that covers each of the play cells. As shown in Fig. 2, each game cell 30 may comprise a matrix of tiles, such as tile 40. The matrix of tiles may be a two-dimensional M x N matrix, where M and N are positive integers such the $M < N$, $M = N$ or $M > N$. The tiles may also be placed in one of a number of possible orientations in the game cell.

Each tile 40 may comprise a matrix of sub-tiles, such as sub-tile 50, formed in a rectangular pattern. The matrix of sub-tiles may be a two-dimensional P x Q matrix, where P and Q are positive integers such that $P < Q$, $P = Q$ or $P > Q$. Each sub-tile

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may further comprise a matrix of dots in a regular pattern. The matrix of dots may be a two-dimensional R x S matrix, where R and S are positive integers such that R < S, R = S or R > S. Each dot may be defined as a predetermined rectangle formed by printer inkjets, e.g., a 2 x 3 rectangle or a 2 x 2 square of inkjet marks.

For example, if one inkjet mark is 0.004167 square inch, then a dot comprising a 2 x 2 square of inkjet marks would be 0.008333 square inch. Further, if a sub-tile comprises a 5 x 5 matrix of dots, and a tile comprises a 3 x 3 matrix of sub-tiles, then the size of a tile is 0.125000 square inch. Thus, if each cell is a 4 x 4 matrix of tiles, then the size of each cell is one-half (0.500000) square inch.

As shown in Fig. 2, there may be two types of dots, i.e., active dots, which appear as black squares, and inactive dots, which appear as white squares. Each sub-tile has a predetermined number of active dots at certain locations. If each sub-tile contains a number T of active dots, where T is a positive integer such that T < RS, then the number of possible sub-tiles that may be formed is the combinations of RS dots chosen T dots at a time, i.e.,

$$C^{T}_{RS} = \frac{(RS)\ !}{T!\ (RS-T)\ !}$$

For the example shown in Fig. 2, there are three active dots in each sub-tile. Since each sub-tile consists of a total of 16 dots (i.e., a 4 x 4 array of dots), there are 560 possible sub-tiles. However, the number of possible sub-tiles may be further limited to a predefined number, e.g., 240, so that each of the sub-tiles in the set of possible sub-

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tiles has desirable distance, synchronization, redundancy and visual properties when printed over or on latex coating 20.

Play cells comprise combinations of tiles, which themselves comprise combinations of sub-tiles. Each play cell has an attribute known as a rotation sequence, which is the particular arrangement of tiles and sub-tiles in the cell. A unique rotation sequence for each ticket is determined and encoded into the pattern of tiles and sub-tiles on an instant ticket. Alternatively, the same rotation sequence may be encoded into the tiles that make up all play cells. There are a large number of different possible rotation sequences that may be used for the tickets of a particular instant game. Based on the rotation sequence, all of the play cells on an instant ticket in combination can be examined to ensure that they all actually belong to that ticket.

A cell security pattern is the pattern of tiles and sub-tiles printed within a play cell. An algorithm, preferably an algorithm that assures mathematical redundancy, may be used to determine a single magnitude or logical value for each tile based on the combination of sub-tiles that make up the tile. The magnitudes may be chosen from a set of defined elements, e.g., the integers from 1 through 9. In the example of Fig. 2, the algorithm may use the combination of sub-tiles used to make up tile 40 to determine a magnitude for the tile, i.e., 4. Thus, the magnitude associated with each tile is represented by the patterns of dots forming the sub-tiles.

Similarly, play cells are made up of combinations of tiles, each of which is associated with a signature value. In the example of Fig. 2, tile 30 comprises four sub-

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tiles which, when read in rows and columns from left to right and bottom, have magnitudes, 4, 2, 5 and 9. A cell security signature (CSS) may be defined as a string of the magnitudes of the tiles 40 of play cell 30 in the same order, i.e., 4259. Similarly, the cell security signatures for the remaining three play cells in Fig. 2 are 5813, 7162 and 3512, respectively. The four cell security signatures shown in Fig. 2 may be represented as follows:

$CSS_1 = 4\ 2\ 5\ 9$

$CSS_2 = 5\ 8\ 1\ 3$

$CSS_3 = 7\ 1\ 6\ 2$

$CSS_4 = 3\ 5\ 1\ 2$

Thus, the cell security signature is an assignment or mapping of a pattern of tile magnitudes based on an ordering of tile magnitudes read in a defined pattern, e.g., in rows and columns from left to right and top to bottom.

Further, by reading the cells from left to right and top to bottom, the cell security signatures for each of the cells may be strung together to create a ticket security signature (TSS). The ticket security signature is the logical combination of cell security signatures that comprise the ticket. The ticket security signature is based on an ordering of the cells read in a defined pattern, e.g., in rows and columns read from left to right and top to bottom. In this case, the ticket security signatures may have the form 4259581371623512, formed as follows:

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$$TSS = 4\,2\,5\,9\,5\,8\,1\,3\,7\,1\,6\,2\,3\,5\,1\,2$$
$$CSS_1 \mid CSS_2 \mid CSS_3 \mid CSS_4$$

The ticket security signatures may be any logical combination of the cell security signatures that comprise the ticket. Preferably, the ticket security signature order will be based on a sequential numbering of the cells on the ticket.

The ticket security signature may be printed on the ticket in the form of a printed alphanumeric character string, which may be covered with an opaque, removable coating such as a latex, or encoded in a machine readable bar code. The ticket security signature may be generated as a function of several variables, including, e.g., the game number, the ticket number, the ticket pack number, and the retail sales location number. By applying a predefined function (f) to these variables, a unique ticket security signature may be determined for each ticket, as follows:

f (game number, ticket number, ticket pack number, retail sales location number) = TSS

such that

$$TSS = CSS_1 \mid CSS_2 \mid CSS_3 \mid CSS_4$$

Alternatively, the ticket security signature may be calculated using a function that uses an otherwise random alphanumeric string printed on the ticket as a seed value.

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The total number of possible cell security patterns for the tiles on a particular card is:

$$N^{(Tiles/Cell)}$$

where N is the number of possible sub-tiles and Tiles/Cell is the number of tiles in each game cell. For the example of Fig. 2, where there may be 240 possible sub-tiles and there are 4 tiles in each game cell, the total number of possible cell security patterns is approximately 3.3×10^9. Thus, there can be a unique cell security pattern for each cell of every instant ticket as long as the total number of cells per ticket multiplied by the total number of tickets for the game (and possibly an additional manufacturing factor) is less than the total number of possible cell security patterns. This will similarly guarantee a unique ticket security signature for each instant gaming ticket. Such a scheme prevents all or a portion of the latex coating from one ticket to be transferred to another ticket as part of a fraudulent scheme to produce a winning ticket.

Fig. 3 shows a method 300 of authenticating an instant ticket according to the present invention. Using this method, a ticket reader 80 (Fig. 1) recreates the ticket security signature for comparison with the ticket security signature read from the ticket. A player scratches off a portion of the latex coating in the play area of the ticket to achieve a winning combination of game indicia (step 305). A ticket reader is used to detect the arrangement of dots forming the sub-tiles and tiles comprising each of the play cells that are not scratched off the play area (step 310). The ticket reader determines the magnitude of each tile within the play cells based on the ordered combination of sub-tiles within the tile (step 320). The cell security signature for each

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cell is determined by forming a string of the tile magnitudes determined by the ticket reader in a predetermined order (step 330). The ticket security signature is then determined by forming a string of the cell security signatures in a predetermined order (step 340). The determined ticket security signature is compared to the ticket security signature printed on the ticket (step 350). If the ticket security signatures are related according to a predetermined criterion, e.g., portions of the signatures are the same, then the ticket is deemed to be authentic, and a prize may be awarded to the player upon verification that a winning combination of game indicia has been uncovered (step 370). If the ticket security signatures are not related according to a predetermined criterion, the ticket is rejected (step 380).

Fig. 4 shows a method 400 of producing an instant gaming ticket according to the present invention. A ticket is first constructed by printing game indicia in a play area on a substrate and then covering the game indicia with an opaque, removable coating (step 405). A ticket security signature is determined for each ticket, e.g., by applying a function to variables such as the game number, the ticket number, the ticket pack number, and the retail sales location number (step 410). Cell security signatures for the cells in the play area are then determined by parsing in order the ticket security signature in a predefined manner (step 420). Each cell security signature is again parsed in order to determine the magnitudes of the tiles which make up each cell of the latex coating (step 430). Based on the magnitudes of the tiles, an appropriate combination of sub-tiles, each of which comprises a matrix pattern of active dots, may be selected from the set of possible sub-tiles such that when read by a ticket reader, the combination of sub-tiles identifies a single magnitude for the tile (step 440). The

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combination of sub-tiles in the form of active dot matrix patterns is then printed over or on the latex coating on the ticket to create the security feature for the ticket that will be used to authenticate the ticket upon redemption (step 450), as shown and described above with respect to Fig. 3.

The use of a dot pattern in the form of tiles and sub-tiles placed over or on the opaque, removable coating in the play area of an instant gaming ticket is a powerful security technique, which enables instant gaming tickets to be produced using variable data patterns for large numbers of tickets. Since there will appear to be no repeatable pattern among the dot patterns, tampering or alteration of instant tickets can be easily detected, and thus discouraged.

Other embodiment are within the scope of the following claims.

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What Is Claimed Is:

1. A secure instant gaming ticket, comprising:

a substrate having a plurality of game indicia and a ticket security signature printed thereon; and

an opaque, removable coating disposed on at least a portion of the plurality of game indicia, the coating having a machine readable security pattern related to the ticket security signature.

2. The secure instant gaming ticket according to claim 1 wherein the ticket security signature is in the form of a machine readable bar code.

3. The secure instant gaming ticket according to claim 1 wherein the ticket security signature is in the form of machine readable characters.

4. The secure instant gaming ticket according to claim 1 wherein the security pattern is a variable data pattern.

5. The secure instant gaming ticket according to claim 1 wherein the security pattern is a pattern of dots.

6. A secure instant gaming ticket, comprising:

a substrate having a plurality of game indicia printed thereon;

a plurality of cells, each cell comprising an opaque removable coating disposed

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on at least one of the plurality of game indicia on the substrate, and each cell further having disposed on the coating a machine readable security pattern indicative of a cell security signature associated with the cell; and

a ticket security signature comprising the cell security signatures associated with each of the plurality of cells.

7. The secure instant gaming ticket according to claim 6 wherein the ticket security signature is printed on the substrate in the form of a machine readable bar code.

8. The secure instant gaming ticket according to claim 6 wherein the ticket security signature is printed on the substrate in the form of machine readable characters.

9. The secure instant gaming ticket according to claim 6 wherein the security pattern is a variable data pattern.

10. The secure instant gaming ticket according to claim 6 wherein the security pattern is a pattern of dots.

11. The secure instant gaming ticket according to claim 6 wherein the ticket security signature is determined on the basis of a string of characters printed on the substrate.

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12. The secure instant gaming ticket according to claim 6 wherein each cell comprises an ordered series of tiles, each tile having an associated magnitude.

13. The secure instant gaming ticket according to claim 12 wherein the ticket security signature is an ordered combination of the magnitudes associated with the tiles.

14. The secure instant gaming ticket according to claim 12 wherein the magnitude associated with each tile is represented by a patten of dots disposed on the coating.

15. An instant gaming ticket authentication system, comprising:

an instant gaming ticket comprising a substrate having a plurality of game indicia and a security signature printed thereon and an opaque, removable coating disposed on at least a portion of the plurality of game indicia, the coating having a machine readable security pattern related to the security signature disposed thereon; and

a ticket reader for determining a ticket security signature based on the security pattern and comparing the determined ticket security signature to the printed security signature on the ticket.

16. A method of producing a secure instant gaming ticket, comprising:

printing game indicia and a ticket security signature comprising a string of characters on a substrate;

covering at least a portion of the game indicia with an opaque, removable

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coating; and

disposing a machine readable security pattern on the coating, the machine readable security pattern being related to the ticket security signature.

17. The method of claim 16 further comprising

determining the machine readable security pattern by parsing the string of characters prior to disposing the machine readable security pattern on the coating.

18. A method of authenticating an instant gaming ticket, the ticket having game indicia printed thereon and an opaque, removable coating covering at least a portion of the game indicia, the coating further having a security pattern disposed thereon, the method comprising:

detecting the security pattern;

determining a ticket security signature using detected security pattern; and

comparing the determined ticket security signature to a printed ticket security signature on the ticket.

19. The method of claim 18 further comprising

rejecting the ticket if the determined ticket security signature and the printed ticket security signature are not related according to a predetermined criterion.

20. The method of claim 18 further comprising

deeming the ticket authentic if the determined ticket security signature and the printed ticket security signature are related according to a predetermined criterion.

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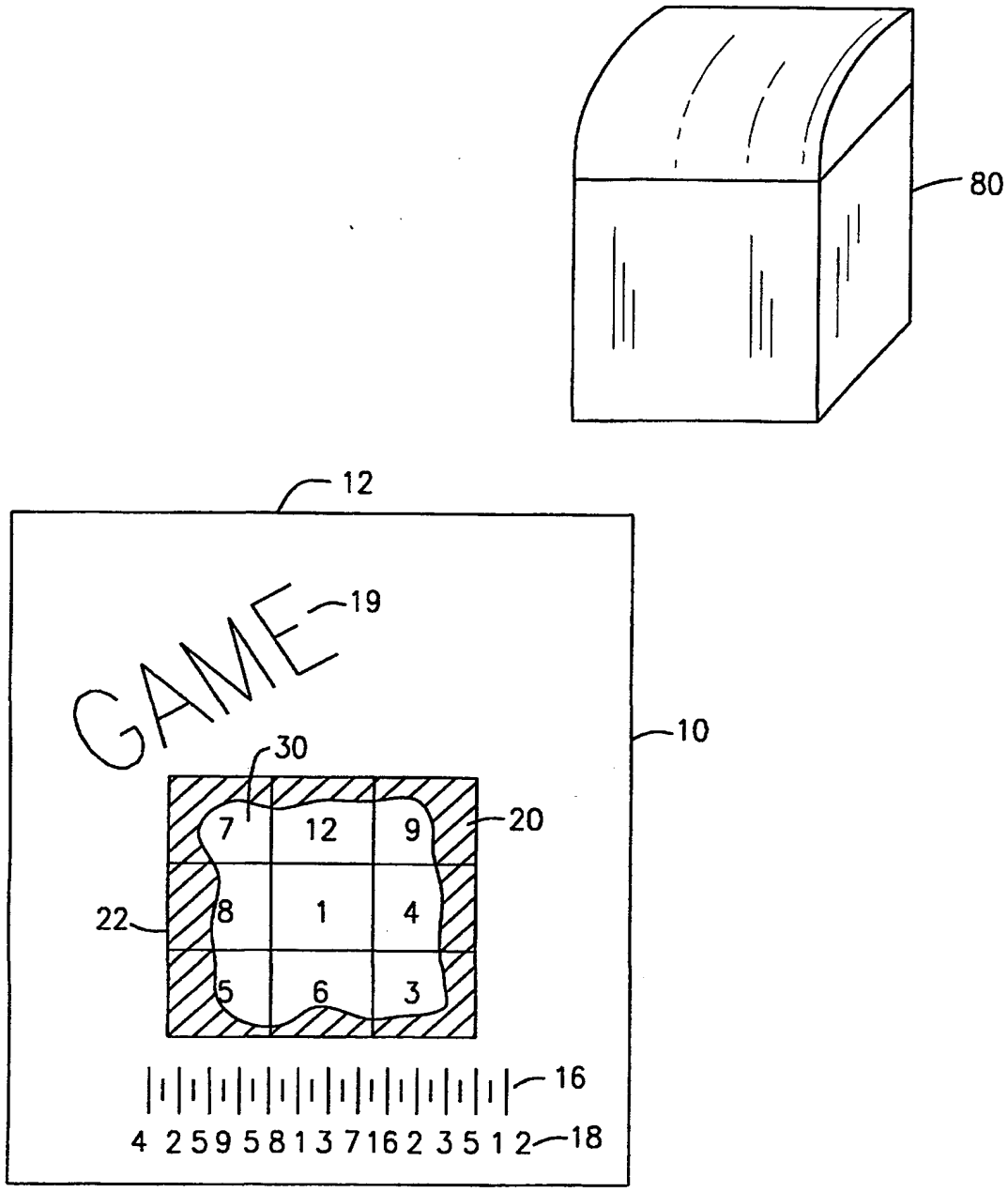

FIG. 1

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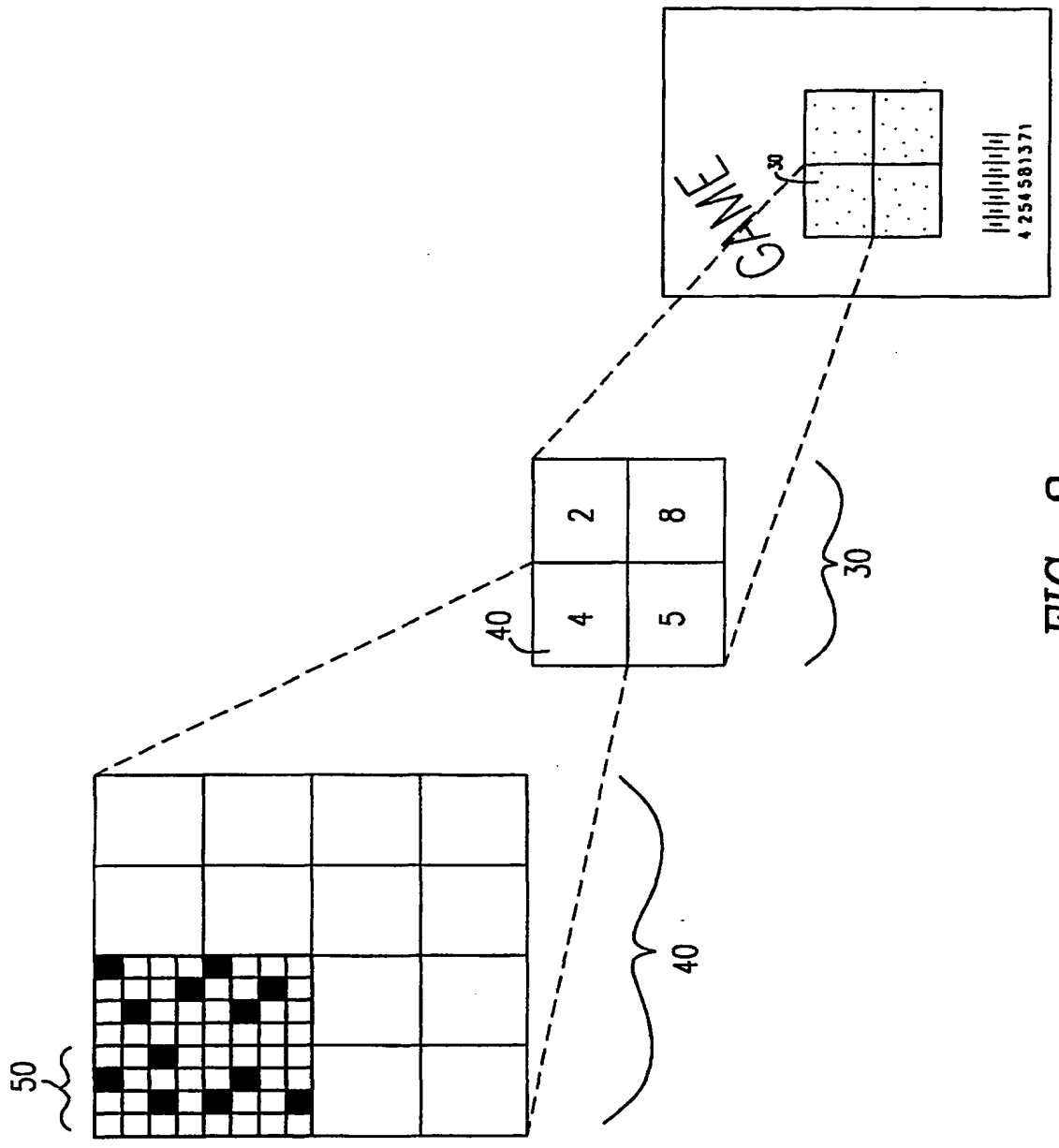

FIG. 2

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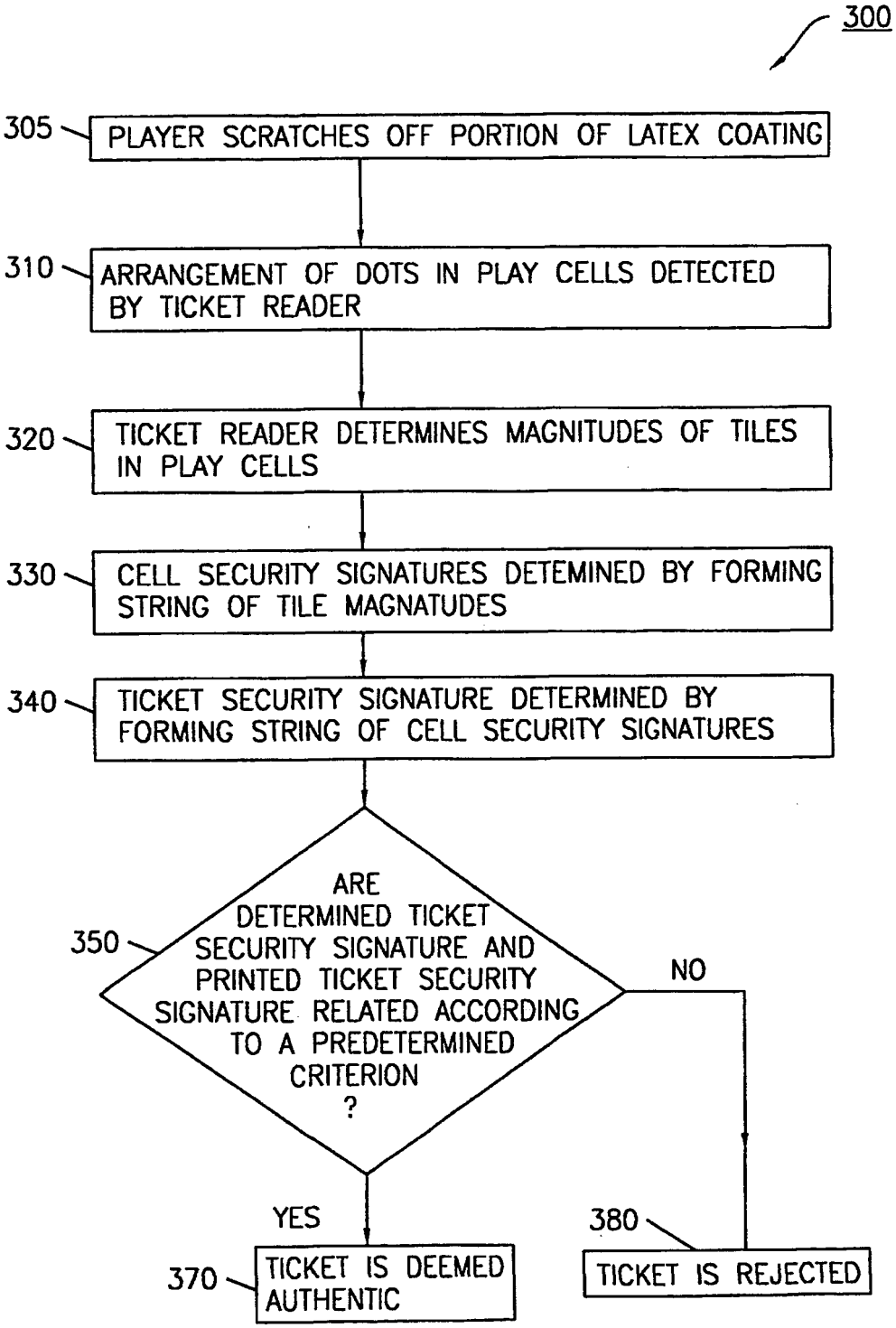

FIG. 3

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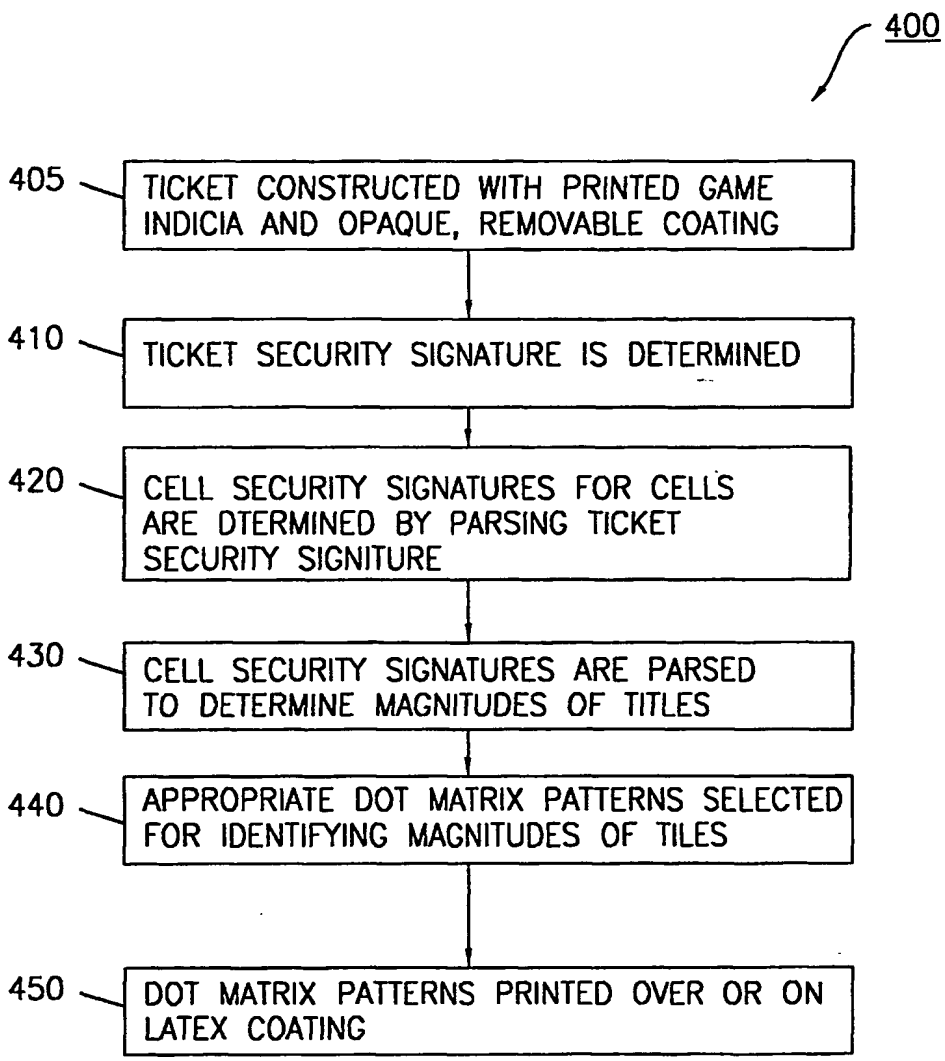

FIG. 4

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/12016

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06K 7/10; A63B 71/00; A63F 3/06; G09B 19/00; B42D 15/00
US CL : 235/462.01; 273/138.1, 139, 269; 283/49, 72, 81, 94, 100, 111, 901, 903

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 235/462.01; 273/138.1, 139, 269; 283/49, 72, 81, 94, 100, 111, 901, 903

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,074,566 A (DESBIENS) DECEMBER 24 1991, SEE COL. 5, LINES 22-27 AND FIGURES 1 AND 4.	1-11 and 15-20
Y	US 5,887,906 A (SULTAN) 30 MARCH 1999, SEE COL. 3, LINES 43-45 AND FIGURE 6.	1-11 and 15-20
Y	US 5,769,458 A (CARIDES ET AL.) 23 JUNE 1998, SEE ENTIRE PATENT.	12-14
A, P	US 6,076,860 A (HOLMAN ET AL.) 20 JUNE 2000.	
A	US 5,791,990 A (SCHROEDER ET AL.) 11 AUGUST 1998.	
A	US 5,451,052 A (BEHM ET AL.) 19 SEPTEMBER 1995.	
A	US 4,832,341 A (MULLER ET AL.) 23 MAY 1989.	

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search	Date of mailing of the international search report
23 May 2001 (23.05.2001)	12 JUN 2001
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Monica S. Carter Telephone No. (703) 308-1148

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